PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference A30506 WO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/GB2005/001269	International filing date *(day/month/year)* 31 March 2005 (31.03.2005)	Priority date *(day/month/year)* 31 March 2004 (31.03.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 10 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 04 October 2006 (04.10.2006)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Nora Lindner e-mail: pt02@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	15 SEPTEMBER 2005 see form PCT/ISA/210 (second sheet)
Applicant's or agent's file reference see form PCT/ISA/220	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB2005/001269	31.03.2005	31.03.2004

International Patent Classification (IPC) or both national classification and IPC
G01M11/00

Applicant
BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2005/001269

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	5-7, 17, 18, 20, 28, 29
	No:	Claims	1-4, 8-16,19, 21-27, 30-32
Inventive step (IS)	Yes:	Claims	5-7
	No:	Claims	17,18, 20, 28, 29
Industrial applicability (IA)	Yes:	Claims	1-32
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1. Reference is made to the following documents:

D1 : US 2003/103211 A1 (LANGE CHARLES ET AL) 5 June 2003 (2003-06-05)

D2 : US 4 572 949 A (BOWERS ET AL) 25 February 1986 (1986-02-25)

D3 : US 5 636 021 A (UDD ET AL) 3 June 1997 (1997-06-03)

D4 : US 6 459 486 B1 (UDD ERIC ET AL) 1 October 2002 (2002-10-01)

2. Although **claims 1** and **32** (method) as well as **22** and **26** (apparatus) have been drafted as separate independent claims, they appear to relate effectively to the same invention and to differ from each other only with regard to the definition of the respective subject-matter for which protection is sought.
It seems to be possible in the present case to draft one independent claim in each category e.g. based on present claims 1 and 22 and dependent claims for the subject-matter of present claims 26 and 32.
The aforementioned claims therefore **lack conciseness (Rule 6.1 (a) PCT)**.

3. In view of document D1 it appears that present **claims 30 and 31** are directed to a **second invention** of sensing the position of a moving vehicle, whereas the first invention, claims 1-29 and 32, is directed to improvements of an interferometer for detecting the position of time-varying disturbances, which is in contradiction to the requirement of **unity of invention (Rule 13.1 PCT).**

INDEPENDENT CLAIM 1

4. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** is not new in the sense of Article 33(2) PCT in view of either **D1, D2, D3 or D4**.

4.1 Document **D1** discloses (the references in parentheses applying to this document) a method of evaluating the position of a time-varying disturbance (Par. 2, wherein the appearance of breaks, cracks or inconsistencies in the optical fibres is time-varying) on a

transmission link (optical fibre, e.g. fibre 150 in Fig. 2B),
the method including the steps of: copying, at least in part, an output signal from a source (102 in Fig. 2B), such that there is a pair of signal copies (by means of beam splitter 202 in Fig. 2B);
transmitting the signal copies onto the transmission link (optical fibre 150 in Fig. 2B);
receiving from the transmission link at least partially returned signal copies previously transmitted thereon (Par. 43); combining the received signal copies of a transmitted pair so as to produce a combination signal (Par. 44, combination in coupler 202 in Fig. 2B); and, using a temporal characteristic (detector intensity is proportional to phase difference between the two combined signals (Par. 50 and Fig. 3) which is a function of the time delay and their optical path length) in the combination signal to evaluate the position of the disturbance on the transmission link (Par. 54 and Fig. 4).

4.2 Document D2 discloses as well a method of evaluating the position of a time-varying disturbance on a transmission link (moving surface on the end of the fibre optic probe , col. 2, l. 67 - col. 3, l. 1) according to claim 1, see apparatus in Fig. 6.

4.3 In view of document D3 see the reasoning given at point 7 below.

4.4 Similarly, document D4 discloses a method of evaluating the position of a time-varying disturbance on a transmission link (time varying environmental effect, col. 3, l. 65-67) according to claim 1, see apparatus in Fig. 1.

INDEPENDENT CLAIM 22

5. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of the apparatus disclosed in **claim 22** is not new in the sense of Article 33(2) PCT in view of either **D1, D2, D3 or D4**, the arguments given at point 4 for the corresponding method applying mutatis mutandis.

INDEPENDENT CLAIM 26

6. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 26** is not new in the sense of Article 33(2) PCT in view of documents **D1, D3 or D4.**

6.1 The arguments given at point 4 applying mutatis mutandis in view of the respective documents D1, D3 or D4.

6.2 Especially, in document **D3**, Fig. 9 distributed reflective elements (854-870) are shown which provide a distributed backscattering of light from the fibre optic link (850). Whereby a processor circuit (e.g. controller 574 in Fig. 4) is arranged to store the interference signal (of the respective interferometers 559, 560, 561) in association with an indication of a temporal characteristic of the return signal (signals monitored from the interferometer 576, 578 and 580 including the time varying environmental effects, see col. 10, l. 61 - col. 11, l. 3).

INDEPENDENT CLAIM 30

7. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 30** is not new in the sense of Article 33(2) PCT in view of **D3.**

7.1 Document D3 discloses (the references in parentheses applying to this document) a sensing system for sensing the position of a moving vehicle (col. 12, l. 36-38 and 48-51) the sensing system having:
a guide track (Fig. 8, track 806) for guiding the movement of the vehicle; an optical channel (802) extending along the guide track; and, monitoring apparatus (812, 816) coupled to the optical channel, wherein the optical channel is mechanically coupled to the guide track such that movement of the vehicle causes a moving disturbance along the optical channel (col. 12, l. 36-38 and 42-44),
the monitoring apparatus (see embodiment in Fig. 2) being configured to (I) detect (using e.g. detectors 160, 162, 168 in Fig. 2) a light signal from the optical channel (e.g. of distributed fibre sensor 100 in Fig. 2) indicative of a the moving disturbance,
(ii) evaluate at least one temporal characteristic of the light signal (determining time dependent interference outputs 182, 184 and 140 in Fig. 2), and (iii) in dependence on the

evaluated temporal characteristic, determine an indication of the position (using position signal 190 in Fig. 2, col. 6, l. 56-59) of the moving disturbance along the channel so that the position of the vehicle along the track can be sensed (Col. 1, l. 4-7).

INDEPENDENT CLAIM 31

8. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 31** is not new in the sense of Article 33(2) PCT in view of document **D3**, see arguments given at point 7 above.

INDEPENDENT CLAIM 32

9. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 32** is not new in the sense of Article 33(2) PCT in view of documents **D1, D2, D3** or **D4**, see arguments given at point 4 above.

DEPENDENT CLAIMS 2-4, 8-21, 23-25, 27-29

10. Dependent **claims 2-4, 8-21, 23-25, 27-29** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

10.1 The additional feature of **claim 2** is known e.g. from D2, Fig. 2, where the moving of the surface (18) is a function of time which is included in the temporal characteristics (Amplitude A as a function of time in equation 11) occurring in the combination signal (signal at the detector A_2A_3 in equation 11). (A 33(2) PCT)

10.2 The additional feature of **claim 3** is known e.g. from D3, see distributed backscattering at fibre gratings 550-554 in Fig. 4 (A 33(2) PCT).

10.3 The additional feature of **claim 4** is known e.g. from D2, see col. 5, l. 12-15 (A 33(2) PCT).

10.4 The additional features of **claims 8-16** and **23-25** are known from either D1 or D2. In view of **D1** see e.g. the interferometer apparatus disclosed in Fig. 2B, comprising a phase modulator 204, typically a piezoelectric modulator, which at the same time modulates the path length and the time delay of the respective path 114 different to that of path 112. In view of document **D2** see the disclosure in Fig. 6 comprising coiled fibres 62 in optical path 14 which results in different path length and time delay of the interferometer arms (col. 4, l. 25-27). (A 33(2) PCT).

10.5 In **claim 17** and **18** a slight constructional change is defined which comes within the scope of the customary practice followed by persons skilled in the art starting from document D2 in order to adapt the interferometer towards smaller optical path differences to improve its sensitivity in view of the restriction for low-coherence of the interferometer light source (D2, col. 3, l. 20-22). (A 33(3) PCT)

10.6 The additional features of **claims 19** and **21** are known from document D3, see embodiment in Fig. 8 (A 33(2) PCT).

10.7 The slight constructional change in **claim 20** comes within the scope of the customary practice followed by the person skilled in the art when starting from D3 with the embodiment of Fig. 8 to improve the transmission of the acoustic signal from the train to the fibre. (A 33(3) PCT)

10.8 The additional feature of **claim 27** is known e.g. from D1, see time-distributed interference signal 316 in Fig. 3 dependent on the time variation of the return signal which determines the measured phase difference of the interfering light beams ((Par. 50 and 54) (A 33(2) PCT).

10.9 In **claims 28** and **29** a slight constructional change is defined which comes within the scope of the customary practice followed by persons skilled in the art starting from D1, especially in order to implement the sampling of the detector output as discribed in Par. 62. (A 33(3) PCT)

11. According to the requirements of **Rule 5.1(a)(ii) PCT**, the relevant **background art** disclosed in the documents D1-D4 should be mentioned in the description.

12. Independent claims are not in the **two-part form** in accordance with **Rule 6.3(b) PCT**, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

13. The features of the claims are not provided with reference signs placed in parentheses **(Rule 6.2(b) PCT)**.

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)* 15 SEPTEMBER 2005 see form PCT/ISA/210 (second sheet)
Applicant's or agent's file reference see form PCT/ISA/220	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB2005/001269	31.03.2005	31.03.2004

International Patent Classification (IPC) or both national classification and IPC
G01M11/00

Applicant
BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

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If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2005/001269

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	5-7, 17, 18, 20, 28, 29
	No:	Claims	1-4, 8-16,19, 21-27, 30-32
Inventive step (IS)	Yes:	Claims	5-7
	No:	Claims	17,18, 20, 28, 29
Industrial applicability (IA)	Yes:	Claims	1-32
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1. Reference is made to the following documents:

D1 : US 2003/103211 A1 (LANGE CHARLES ET AL) 5 June 2003 (2003-06-05)

D2 : US 4 572 949 A (BOWERS ET AL) 25 February 1986 (1986-02-25)

D3 : US 5 636 021 A (UDD ET AL) 3 June 1997 (1997-06-03)

D4 : US 6 459 486 B1 (UDD ERIC ET AL) 1 October 2002 (2002-10-01)

2. Although **claims 1** and **32** (method) as well as **22** and **26** (apparatus) have been drafted as separate independent claims, they appear to relate effectively to the same invention and to differ from each other only with regard to the definition of the respective subject-matter for which protection is sought.
It seems to be possible in the present case to draft one independent claim in each category e.g. based on present claims 1 and 22 and dependent claims for the subject-matter of present claims 26 and 32.
The aforementioned claims therefore **lack conciseness (Rule 6.1 (a) PCT)**.

3. In view of document D1 it appears that present **claims 30 and 31** are directed to a **second invention** of sensing the position of a moving vehicle, whereas the first invention, claims 1-29 and 32, is directed to improvements of an interferometer for detecting the position of time-varying disturbances, which is in contradiction to the requirement of **unity of invention (Rule 13.1 PCT).**

INDEPENDENT CLAIM 1

4. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** is not new in the sense of Article 33(2) PCT in view of either **D1, D2, D3 or D4**.

4.1 Document **D1** discloses (the references in parentheses applying to this document) a method of evaluating the position of a time-varying disturbance (Par. 2, wherein the appearance of breaks, cracks or inconsistencies in the optical fibres is time-varying) on a

transmission link (optical fibre, e.g. fibre 150 in Fig. 2B),
the method including the steps of: copying, at least in part, an output signal from a source (102 in Fig. 2B), such that there is a pair of signal copies (by means of beam splitter 202 in Fig. 2B);
transmitting the signal copies onto the transmission link (optical fibre 150 in Fig. 2B);
receiving from the transmission link at least partially returned signal copies previously transmitted thereon (Par. 43); combining the received signal copies of a transmitted pair so as to produce a combination signal (Par. 44, combination in coupler 202 in Fig. 2B); and, using a temporal characteristic (detector intensity is proportional to phase difference between the two combined signals (Par. 50 and Fig. 3) which is a function of the time delay and their optical path length) in the combination signal to evaluate the position of the disturbance on the transmission link (Par. 54 and Fig. 4).

4.2 Document D2 discloses as well a method of evaluating the position of a time-varying disturbance on a transmission link (moving surface on the end of the fibre optic probe , col. 2, l. 67 - col. 3, l. 1) according to claim 1, see apparatus in Fig. 6.

4.3 In view of document D3 see the reasoning given at point 7 below.

4.4 Similarly, document D4 discloses a method of evaluating the position of a time-varying disturbance on a transmission link (time varying environmental effect, col. 3, l. 65-67) according to claim 1, see apparatus in Fig. 1.

INDEPENDENT CLAIM 22

5. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of the apparatus disclosed in **claim 22** is not new in the sense of Article 33(2) PCT in view of either **D1, D2, D3 or D4**, the arguments given at point 4 for the corresponding method applying mutatis mutandis.

INDEPENDENT CLAIM 26

6. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 26** is not new in the sense of Article 33(2) PCT in view of documents **D1, D3 or D4**.

6.1 The arguments given at point 4 applying mutatis mutandis in view of the respective documents D1, D3 or D4.

6.2 Especially, in document **D3**, Fig. 9 distributed reflective elements (854-870) are shown which provide a distributed backscattering of light from the fibre optic link (850). Whereby a processor circuit (e.g. controller 574 in Fig. 4) is arranged to store the interference signal (of the respective interferometers 559, 560, 561) in association with an indication of a temporal characteristic of the return signal (signals monitored from the interferometer 576, 578 and 580 including the time varying environmental effects, see col. 10, l. 61 - col. 11, l. 3).

INDEPENDENT CLAIM 30

7. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 30** is not new in the sense of Article 33(2) PCT in view of **D3.**

7.1 Document D3 discloses (the references in parentheses applying to this document) a sensing system for sensing the position of a moving vehicle (col. 12, l. 36-38 and 48-51) the sensing system having:
a guide track (Fig. 8, track 806) for guiding the movement of the vehicle; an optical channel (802) extending along the guide track; and, monitoring apparatus (812, 816) coupled to the optical channel, wherein the optical channel is mechanically coupled to the guide track such that movement of the vehicle causes a moving disturbance along the optical channel (col. 12, l. 36-38 and 42-44),
the monitoring apparatus (see embodiment in Fig. 2) being configured to (I) detect (using e.g. detectors 160, 162, 168 in Fig. 2) a light signal from the optical channel (e.g. of distributed fibre sensor 100 in Fig. 2) indicative of a the moving disturbance,
(ii) evaluate at least one temporal characteristic of the light signal (determining time dependent interference outputs 182, 184 and 140 in Fig. 2), and (iii) in dependence on the

evaluated temporal characteristic, determine an indication of the position (using position signal 190 in Fig. 2, col. 6, l. 56-59) of the moving disturbance along the channel so that the position of the vehicle along the track can be sensed (Col. 1, l. 4-7).

INDEPENDENT CLAIM 31

8. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 31** is not new in the sense of Article 33(2) PCT in view of document **D3**, see arguments given at point 7 above.

INDEPENDENT CLAIM 32

9. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 32** is not new in the sense of Article 33(2) PCT in view of documents **D1, D2, D3** or **D4**, see arguments given at point 4 above.

DEPENDENT CLAIMS 2-4, 8-21, 23-25, 27-29

10. Dependent **claims 2-4, 8-21, 23-25, 27-29** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

10.1 The additional feature of **claim 2** is known e.g. from D2, Fig. 2, where the moving of the surface (18) is a function of time which is included in the temporal characteristics (Amplitude A as a function of time in equation 11) occurring in the combination signal (signal at the detector A_2A_3 in equation 11). (A 33(2) PCT)

10.2 The additional feature of **claim 3** is known e.g. from D3, see distributed backscattering at fibre gratings 550-554 in Fig. 4 (A 33(2) PCT).

10.3 The additional feature of **claim 4** is known e.g. from D2, see col. 5, l. 12-15 (A 33(2) PCT).

10.4 The additional features of **claims 8-16** and **23-25** are known from either D1 or D2. In view of **D1** see e.g. the interferometer apparatus disclosed in Fig. 2B, comprising a phase modulator 204, typically a piezoelectric modulator, which at the same time modulates the path length and the time delay of the respective path 114 different to that of path 112. In view of document **D2** see the disclosure in Fig. 6 comprising coiled fibres 62 in optical path 14 which results in different path length and time delay of the interferometer arms (col. 4, l. 25-27). (A 33(2) PCT).

10.5 In **claim 17** and **18** a slight constructional change is defined which comes within the scope of the customary practice followed by persons skilled in the art starting from document D2 in order to adapt the interferometer towards smaller optical path differences to improve its sensitivity in view of the restriction for low-coherence of the interferometer light source (D2, col. 3, l. 20-22). (A 33(3) PCT)

10.6 The additional features of **claims 19** and **21** are known from document D3, see embodiment in Fig. 8 (A 33(2) PCT).

10.7 The slight constructional change in **claim 20** comes within the scope of the customary practice followed by the person skilled in the art when starting from D3 with the embodiment of Fig. 8 to improve the transmission of the acoustic signal from the train to the fibre. (A 33(3) PCT)

10.8 The additional feature of **claim 27** is known e.g. from D1, see time-distributed interference signal 316 in Fig. 3 dependent on the time variation of the return signal which determines the measured phase difference of the interfering light beams ((Par. 50 and 54) (A 33(2) PCT).

10.9 In **claims 28** and **29** a slight constructional change is defined which comes within the scope of the customary practice followed by persons skilled in the art starting from D1, especially in order to implement the sampling of the detector output as discribed in Par. 62. (A 33(3) PCT)

11. According to the requirements of **Rule 5.1(a)(ii) PCT**, the relevant **background art** disclosed in the documents D1-D4 should be mentioned in the description.

12. Independent claims are not in the **two-part form** in accordance with **Rule 6.3(b) PCT**, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

13. The features of the claims are not provided with reference signs placed in parentheses **(Rule 6.2(b) PCT)**.